near 45° N., 140° to 150° W., in the midst of the stormy weather, pressures as low as 965 millibars (28.5 inches) were reported. On the 19th gales of force 9 were observed at various points from near the Alaska Peninsula to the coast of Oregon.

No sooner had this vast storm area receded northward to the Gulf of Alaska, than a secondary LOW appeared near 35° N., 140° W., on the 20th, accompanied by fresh to strong gales in the vicinity. On the 21st the storm center lay at some distance off the north-central coast of California, attended by heavy weather at sea, and by violent gales of force 11 to 12 close in along the coast from northern California to Vancouver Island. At North Head, Wash., the wind attained its maximum velocity of 84 miles from south on that date, while at Tatoosh Island the highest speed, 88 miles from south, occurred on the 22d. On land extensive damage was done by the strong winds, and the accompanying heavy rains and floods, and off the coast several small vessels lost their lumber cargoes and were placed in precarious situations.

The center of this storm entered the British Columbia coast on the 22d, but stormy weather continued in less degree far to the southward, and a new LOW to the westward was further threatening the storm-beaten region. This LOW, central about midway between Washington and the eastern Aleutians on the 22d, spread eastward and southward during the 23d and 24th, accompanied by widespread gales in a broad region over which pressure fell far below 982 millibars (29 inches). While the wind velocities in American coastal waters did not attain the height reached on the 21st and 22d, they were nevertheless strong. Many instances of force 10 gales were reported at sea on the 23d and 24th, and on the latter date the extreme northwest-southeast range over which whole gales were scatteringly reported, was from about 50° N., 155° W., to about 33° N., 127° W. The general wind intensity near the Oregon coast may be indicated by the report of the American S. S. *Mauna Kea,* Portland to Honolulu. This vessel, storm beaten from the 23d to 25th, encountered her highest wind, a south gale of force 10, barometer 967.5 millibars (28. 57 inches), on the early morning of the 24th, near 45° N., 128° W.

During the 25th and 26th, as the storm slowly moved northward, conditions ameliorated in west coast waters, but the seas continued high, and some gales of force 9 continued off the Oregon coast and vicinity. On Christmas Eve, according to newspaper accounts, while the schooner *Stanwood* was in distress off Point Arena, 10 Coast Guardsmen set out to her rescue in motorboats. They became involved in the high seas and poor visibility and were lost to observation. They finally were themselves rescued, some 36 hours later, following a long and arduous search, during which another rescue vessel reached the *Stanwood.*

During the 27th a cyclone developed about midway between the Hawaiian Islands and Lower California. On that day the American S. S. *Manoa* had a northeast gale of force 9 near 28° N., 137° W. The storm deepened on the 28th, and at about 34° to 35° N., 132° to 133° W., both the *President Cleveland* and the *Maunalei* had northerly gales of force 10. On the 29th, as the storm neared the southern coast of California, the U. S. S. *Kanawha,* with a barometer of 988.2 millibars (29.18 inches), experienced a northwesterly gale of force 9 in 30°30′ N., 125°30′ W. During the night of the 29th–30th, the disturbance entered the coast as a mere depression.

The month closed with a storm of the 30th and 31st in northern waters, accompanied on the 30th by winds of force 10 to 11 within the region of about 42° to 48° N., 165° to 175° E., and scattered gales of less force to the southward.

Tropical cyclones.—Subjoined in a report by the Reverend Bernard F. Doucette, Weather Bureau, Manila, P. I., of four typhoons of the month in Far Eastern waters.

Tehuantepecers.—In the Gulf of Tehuantepec northeasterly gales associated with high pressure to the northward, occurred as follows: of force 7 on the 17th, of force 8 on the 5th, and of force 9 on the 2d.

Fog.—Very little fog was encountered far at sea. Ships reported it on 3 days off the Washington and Oregon coasts, on 13 days off the California coast, and on 2 days off the upper coast of Lower California.

TYPHOONS AND DEPRESSIONS OVER THE FAR EAST

By BERNARD F. DOUCETTE, S. J.

[Weather Bureau, Manila, P. I.]

Typhoon, December 2–7, 1940.—This storm appeared to intensify very quickly in a low-pressure area between Yap and Mindanao. It moved west-northwest to a position close to and east of central Samar and then continued on a westerly course across the Visayan Islands into the China Sea. This course was very close to and south of Catbalogan, Samar Province, close to and and north of Capiz, Capiz Province, and within 60 miles of the southern part of Mindora Island. Over the China Sea, it changed its direction to the west-northwest until the afternoon of December 6 when it began moving along a southwesterly course to the region about 100 miles east of southern Indochina, where it disappeared December 7.

At Barongan, Samar Province, the barometric minimum was 739.87 mm. (986.4 mb.) with southwest winds, force 6. Catbalogan, Samar Province, had 735.83 mm. (978.7 mb.) with north-northeast winds, force 2, at its lowest value. Capiz, Capiz Province, reported 743.92 mm. (991.7 mb.) as the minimum value. The first two stations were under the influence of the typhoon during the early forenoon hours of December 3, while Capiz experienced its share of the typhoon strength during the early evening hours of the same day.

No lives were lost, due to this storm, as far as could be learned from the daily papers, but the damage to roads and bridges due to flooded rivers was considerable.

Typhoon, December 3–13, 1940.—As a depression, this storm moved west-northwest from a position about 300 miles east of Yap, intensifying to typhoon strength, December 5, when it reached the region about 500 miles east of San Bernardino Strait. It moved westerly and then inclined to west-northwest when approaching the archipelago, a change which carried the storm center over the northern part of Catanduanes Island. The progress of the center was checked, December 7 and 8, when it was north of Camarines Norte Province and the center appeared to be recurving to the northeast. However, it did not move very far in this direction and during the night of December 8 to 9 it reversed its course and moved rather rapidly toward the southwest. The center, violent over a small area, passed between Capalonga and Daet, Camarines Norte Province, then over the Bondoc Peninsula and north of Marinduque Island. It continued weakening as it moved, and passed over the central or northern part of Mindoro Island on its way to the China Sea. It moved westerly away from the archipelago and shifted to the southwest 1 day before it disappeared east of southern Indo China, December 13.

The vortex, as it passed over the northern part of Catanduanes Island, affected the weather bureau station at Virac, but full details are not available at the present writing. The lowest pressure value reported as the storm approached the island, was 744 mm. (991.9 mb.) with northwest winds, force 8, December 6, 8 p. m. (Manila time). After the storm reversed its course and was moving southwest, Capalonga had a minimum of 742.00 mm. (989.3 mb.) with winds from the north-northwest, force 12. Daet reported 739.46 mm. (986.0 mb.) with winds from the south-southeast, force 8. These values were recorded between midnight and 1:30 a. m. December 9. Boac, Marinduque Island, had 739.96 mm. (986.6 mb.) with south-southeast winds, force 7, during the early forenoon of the same day.

There were 60 lives lost on Catanduanes Island due to this typhoon. After it reversed its course, 10 laborers lost their lives when a tree fell on their house at Exciban Camp, Labo, Camarines Norte, and three people drowned between Polillo Island and Camarines Norte. There was great property damage due to the winds and the rains, and even more indirect loss, due to failure of power lines, etc., forcing mines and mills to shut down for repairs.

Typhoon, December 8–19, 1940.—This center formed far to the south-southeast of Guam and moved north or north-northwest, passing close to and east of Guam during the early morning hours of December 10. It changed to the west when about 100 miles north-northeast of Guam, moving about 400 miles along this course. Then it changed to the southwest and west-southwest, threatening Samar Island. But its progress was checked and it apparently weakened over the regions about 150 miles east of southern Samar. As a low pressure area it probably reversed its course, moving about 200 miles to the east. After December 19, it was certain that the storm was no longer in existence.

At Guam, a series of observations was made as the typhoon center moved north or north-northwest toward the island, and the lowest value reported was 748.50 mm. (998.50 mb.) with west winds, force 5, as the center passed about 60 miles east of the station (December 10, 4 a. m. Guam time).

During these typhoons, the upper winds were almost the same for each storm, the northeast and east quadrant winds much stronger and more active than the southwest quadrant winds. As these centers approached the Philippines, the east quadrant winds at Zamboanga and Cebu changed to the southwest quadrant, and Cebu winds usually were stronger than those over Zamboanga. Only a few reports were received at the observatory to give an idea of the upper winds over the Netherland East Indies, and that which was most significant was a strong southwest current (i. e. 50 k. p. h., or more) over Batavia, December 12, (Typhoon of December 8–19), which however, did not persist. This one ascent is the only indication throughout the month of any activity in the southwest monsoon current. The typhoon of December 3 to 13, which made a loop about 100 miles east of Manila, was under the influence of a strengthening northeast quadrant current and perhaps the shift to the southwest took place because the southwesterly winds were weak. All of these three typhoons changed their courses from westerly or west-northwesterly, to the southwest, very likely due to weak southwest monsoon winds and strong northeast monsoon winds.

Typhoon, approximately December 18–22, 1940.—There were a few reports from ships, names unknown, December 19 and 20, showing that a typhoon was in existence far to the east or east-northeast of Guam. The storm appeared to be moving northeast or north-northeast toward the regions north of Midway Island. From the information available, the center crossed the date line December 21, but more data will be required to be sure of this. On December 27, the newspapers had a dispatch originating in Honolulu, reporting the death of two men on board the S. S. *Etolin*, which was under the influence of the typhoon, December 20. These two men were injured so seriously that they died before the ship reached Honolulu, December 27.